

What is claimed is:

1. A system for automatically correcting flight path of an aircraft onto a predetermined trajectory, the system comprising:
 - a sensor configured to sense speed of air relative to an aircraft at a predetermined distance in front of the aircraft;
 - a navigation system configured to determine displacement of flight path of the aircraft from a predetermined trajectory; and
 - a processor coupled to receive the sensed speed of air from the sensor and the displacement of the flight path from the navigation system, the processor including:
 - a first component configured to determine whether the speed of the air at the predetermined distance is indicative of turbulence; and
 - a second component configured to automatically generate control signals to correct the flight path of the aircraft from the displacement onto the predetermined trajectory by a time when the aircraft enters the turbulence.
2. The system of Claim 1, wherein the second component automatically generates the control signals responsive to the indication of turbulence.
3. The system of Claim 2, wherein the second component automatically generates the control signals further responsive to the displacement of the flight path.
4. The system of claim 3, wherein the displacement of the flight path includes a position error component.
5. The system of Claim 1, wherein the sensor includes an optical sensor.
6. The system of Claim 5, wherein the optical sensor includes a laser.
7. The system of Claim 6, wherein the laser includes a laser Doppler velocimeter system.
8. The system of Claim 1, wherein the predetermined distance is less than around 1,000 meters.
9. The system of Claim 8, wherein the predetermined distance is around 100 feet.
10. The system of Claim 1, wherein the aircraft includes an unmanned aircraft.

11. The system of Claim 10, wherein the unmanned aircraft includes a rocket propelled vehicle.

12. The system of Claim 11, wherein the rocket propelled vehicle includes a missile.

13. The system of Claim 10, wherein the unmanned aircraft includes a drone.

5 14. A method for automatically correcting flight path of an aircraft onto a predetermined trajectory, the method comprising:

sensing speed of air relative to an aircraft at a predetermined distance in front of the aircraft;

10 determining whether the speed of the air at the predetermined distance is indicative of turbulence;

determining displacement of a flight path of the aircraft from a predetermined trajectory; and

automatically correcting the flight path of the aircraft from the displacement onto the predetermined trajectory by a time when the aircraft enters the turbulence.

15 15. The method of Claim 14, wherein automatically correcting the flight path includes automatically generating control signals.

16. The method of Claim 15, wherein the control signals are generated responsive to the indication of turbulence.

20 17. The method of claim 16, wherein the control signals are further generated responsive to the displacement of the flight path.

18. The method of Claim 17, wherein the displacement of the flight path includes a position error component.

19. The method of Claim 14, wherein automatically correcting the flight path includes automatically positioning control surfaces.

25 20. The method of Claim 14, wherein the speed of the air is sensed by an optical sensor.

21. The method of Claim 20, wherein the optical sensor includes a laser.

22. The method of Claim 21, wherein the laser includes a laser Doppler velocimeter system.



25315

PATENT TRADEMARK OFFICE

23. The method of Claim 14, wherein the predetermined distance is less than around 1,000 meters.

24. The method of Claim 23, wherein the predetermined distance is around 100 feet.

25. The method of Claim 14, wherein the aircraft includes an unmanned aircraft.

5 26. The method of Claim 25, wherein the unmanned aircraft includes a rocket propelled vehicle.

27. The method of Claim 26, wherein the rocket propelled vehicle includes a missile.

28. The method of Claim 25, wherein the unmanned aircraft includes a drone.

29. A system for automatically correcting flight path of an aircraft onto a predetermined
10 trajectory, the system comprising:

an optical sensor configured to sense speed of air relative to an aircraft at a predetermined distance in front of the aircraft;

a navigation system configured to determine displacement of flight path of the aircraft from a predetermined trajectory; and

15 a processor coupled to receive the sensed speed of air from the sensor and the displacement of the flight path from the navigation system, the processor including:

a first component configured to determine whether the speed of the air at the predetermined distance is indicative of turbulence; and

20 a second component configured to automatically generate control signals responsive to the indication of turbulence and further responsive to the displacement of the flight path to correct the flight path of the aircraft from the displacement onto the predetermined trajectory by a time when the aircraft enters the turbulence.

30. The system of Claim 29, wherein the displacement of the flight path includes a position error component.

25 31. The system of Claim 29, wherein the optical sensor includes a laser.

32. The system of Claim 31, wherein the laser includes a laser Doppler velocimeter system.

33. The system of Claim 29, wherein the predetermined distance is less than around 1,000 meters.



25315

PATENT TRADEMARK OFFICE



34. The system of Claim 33, wherein the predetermined distance is around 100 feet.
35. The system of Claim 29, wherein the aircraft includes an unmanned aircraft.
36. The system of Claim 35, wherein the unmanned aircraft includes a rocket propelled vehicle.
- 5 37. The system of Claim 36, wherein the rocket propelled vehicle includes a missile.
38. The system of Claim 35, wherein the unmanned aircraft includes a drone.
39. A method for automatically correcting flight path of an aircraft onto a predetermined trajectory, the method comprising:
- 10 optically sensing speed of air relative to an aircraft at a predetermined distance in front of the aircraft;
- determining whether the speed of the air at the predetermined distance is indicative of turbulence;
- determining displacement of a flight path of the aircraft from a predetermined trajectory; and
- 15 automatically generating control signals responsive to the indication of turbulence and further responsive to the displacement of the flight path to correct the flight path of the aircraft from the displacement onto the predetermined trajectory by a time when the aircraft enters the turbulence.
40. The method of Claim 39, wherein the displacement of the flight path includes a position error component.
- 20 41. The method of Claim 39, wherein the flight path is corrected by positioning control surfaces.
42. The method of Claim 39, wherein the optical sensor includes a laser.
43. The method of Claim 42, wherein the laser includes a laser Doppler velocimeter
- 25 system.
44. The method of Claim 39, wherein the predetermined distance is less than around 1,000 meters.
45. The method of Claim 44, wherein the predetermined distance is around 100 feet.



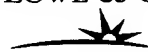
25315

PATENT TRADEMARK OFFICE

- 12 -

BOEI-1-1146-AP

BLACK LOWE & GRAHAM ^{PLLC}


816 Second Avenue
Seattle, Washington 98104
206.381.3300 • F: 206.381.3301

46. The method of Claim 39, wherein the aircraft includes an unmanned aircraft.
47. The method of Claim 46, wherein the unmanned aircraft includes a rocket propelled vehicle.
48. The method of Claim 47, wherein the rocket propelled vehicle includes a missile.
- 5 49. The method of Claim 46, wherein the unmanned aircraft includes a drone.
50. An aircraft comprising:
a fuselage;
an engine;
control surfaces; and
- 10 a system for automatically correcting flight path of an aircraft onto a predetermined trajectory, the system including:
a sensor configured to sense speed of air relative to an aircraft at a predetermined distance in front of the aircraft;
a navigation system configured to determine displacement of flight path of the aircraft
15 from a predetermined trajectory; and
a processor coupled to receive the sensed speed of air from the sensor and the displacement of the flight path from the navigation system, the processor including:
a first component configured to determine whether the speed of the air or the
predetermined distance is indicative of turbulence; and
20 a second component configured to automatically generate control signals to correct the flight path of the aircraft from the displacement onto the predetermined trajectory by a time when the aircraft enters the turbulence.
51. The aircraft of Claim 50, wherein the second component automatically generates the control signals responsive to the indication of turbulence.
- 25 52. The aircraft of Claim 51, wherein the second component automatically generates the control signals further responsive to the displacement of the flight path.
53. The aircraft of Claim 52, wherein the displacement of the flight path includes a position error component.
54. The aircraft of Claim 50, wherein the sensor includes an optical sensor.

55. The aircraft of Claim 54, wherein the optical sensor includes a laser.

56. The aircraft of Claim 55, wherein the laser includes a laser Doppler velocimeter system.

57. The aircraft of Claim 50, wherein the predetermined distance is less than around
5 1,000 meters.

58. The aircraft of Claim 57, wherein the predetermined distance is around 100 feet.

59. The aircraft of Claim 50, wherein the aircraft includes an unmanned aircraft.

60. The aircraft of Claim 59, wherein the unmanned aircraft includes a rocket propelled
vehicle.

10 61. The aircraft of Claim 60, wherein the rocket propelled vehicle includes a missile.

62. The aircraft of Claim 59, wherein the unmanned aircraft includes a drone.

